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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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James P. Nadeau

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MICHAEL O. SCHEINBERG

P.O. BOX 164140

AUSTIN, TX 78716-4140

EXAMINER

MCDONALD, RODNEY GLENN

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/716,181	Applicant(s) NADEAU ET AL.	
	Examiner Rodney G. McDonald	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 15-24, 26-32, 34-39 and 42-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-8, 15-24, 26-29 and 34-38 is/are allowed.
- 6) ☒ Claim(s) 30-32, 39 and 42-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1-30-09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Prosecution Reopened

At the outset the previous action was not intended to be made Final. However Applicant has treated it in that manner. The Examiner has entered the previous response and has treated it on the merits.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 30-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 30 is indefinite because it depends upon a cancelled claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 42-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao et al. (U.S. Pat. 5,874,010) in view of Hong et al. (U.S. Pat 6,198,608).

Regarding claim 42, Tao et al. teach a method of exposing a planar cross-section of a structure composed of a first material. (Fig. 1c, Fig. 1d) The method comprises depositing a layer of a second material on the structure. The second material having mill rates at a higher incidence angles that closely approximate the mill rates of the first material at those incidence angles. (Column 3 lines 66-67; Column 4 lines 1-7; Column 4 lines 37-64) An ion beam is directed at the structure. (Column 4 lines 20-36) Milling the structure in order to expose a cross-section of the structure thereby producing a uniformly planar face on the exposed cross-section. (Column 4 lines 20-36; Column 5 lines 1-19)

The differences between Tao et al. and the present claims is that the determination steps and selecting steps are not discussed (Claim 42), the second material having a mill rate at incidence angles greater than 75 degrees that closely approximate the mill rates of the first material at incidence angles greater than 75 degrees is not discussed (Claim 43), that the second material having a mill rate at incidence angles greater than 75 degrees that are equal to or slightly greater than mill rates of the first material at incidence angles greater than 75 degrees is not discussed (Claim 44), the second material has mill rates at incidence angles greater than 45

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degrees that approximate the mill rates of the first material at incidence angles greater than 45 degrees is not discussed (Claim 45) and the second material has mill rates at incidence angles greater than 45 degrees that are equal to or greater than the mill rates of the first material at incidence angles greater than 45 degrees is not discussed (Claim 46).

Hong et al. teach that the second material can be DLC (i.e. carbon) used in place of TiC or TaC. (Column 5 lines 28-37)

Regarding claim 42, Tao et al. and Hong et al. discuss the steps except for the determining steps. However, by selection of the layers in Tao et al. one determines what layers to select and each layer has it's own etching characteristics. (See Tao et al. and Hong et al. discussed above; Tao et al. Table)

Regarding claims 43, 44, Hong et al. teach that the second material can be DLC (i.e. carbon) used in place of TiC or TaC. (Column 5 lines 28-37)

Regarding claim 45, Tao et al. teach the tungsten would have mill rates at incidence angles greater than 45 degrees that closely approximate the mill rates of the first material at incidence angles greater than 45 degrees. (Column 4 lines 37-64)

Regarding claim 46, Tao et al. teach the tungsten would have mill rates at incidence angles greater than 45 degrees that are equal to or slightly greater than the mill rates of the first material at incidence angles greater than 45 degrees. (Column 4 lines 37-64)

The motivation for utilizing the features of Hong et al. is that it allows for utilizing a low milling rate material. (Column 4 lines 62-65)

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Tao et al. with the features of Hong et al. because it allows for utilizing a low milling rate material.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tao et al. (U.S. Pat. 5,874,010) in view of Hong et al. (U.S. Pat 6,198,608) and further in view of

Tao et al. teach a structure composed of permalloy. (Column 3 lines 36-37) Tao et al. teach directing a charged particle beam at the structure to expose a planar cross-section. An ion beam is directed at the structure. (Column 4 lines 20-36) Milling the structure in order to expose a cross-section of the structure thereby producing a uniformly planar face on the exposed cross-section. (Column 4 lines 20-36; Column 5 lines 1-19)

The differences between Tao et al. and the present claims is that utilizing a carbon layer discussed, directing an electron beam at the cross-section is not discussed and measuring the width of the structure cross-section is not discussed.

Regarding utilizing a carbon layer, Hong et al. teaches that the second material can be DLC (i.e. carbon). (Column 5 lines 28-37)

The motivation for utilizing the features of Hong et al. is that it allows for utilizing a low milling rate material. (Column 4 lines 62-65)

Regarding directing an electron beam at the cross-section, Wagner teaches directing an electron beam at the cross-section. (Column 7 lines 65-68; Column 8 lines 1-12; Column 34-36)

Regarding measuring the width of the structure cross-section, Wagner teaches measuring the width. (Column 6 lines 41-45)

The motivation for utilizing the features of Wagner is that it allows for measuring dimensions of the feature. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Hong et al. by utilizing the features of Hong et al. and Wagner because it allows for utilizing low rate milling material and for measuring dimensions of the feature.

Allowable Subject Matter

Claims 1-8, 15-23, 24, 26-29, 34-38 are allowed.

Claims 30-32 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 1-8 are allowable over the prior art of record because the prior art of record does not teach depositing a layer of a second material on the structure, the second material having mill rates at higher incidence angles that match the mill rates of the first material at those incidence angles; directing an ion beam at the structure; milling the structure in order to expose a cross-section of the structure thereby producing a uniformly planar face on the exposed cross-section.

Claims 15-23 are allowable over the prior art of record because the prior art of record does not teach depositing a layer of a second material on the structure, the

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second material having mill rates at higher incidence angles that matches the mill rates of the first material at those incidence angles; directing an ion beam at the structure in order to expose a planar cross-section of the structure and the layer of the second material.

Claims 24, 26-29, 34-38 are allowable over the prior art of record because the prior art of record does not teach determining whether a planar or non-planar cross-section topography is desired; determining the approximate mill rate of the second material at higher incidence angles; if a planar cross-section is desired, selecting a first material from known materials having a mill rate at higher incidence angles that match the mill rates of the first material at those incidence angles; and if a non-planar cross-section is desired selecting a first material from known materials having a mill rate at higher incidence angles that does not match the mill rates of the first material at those incidence angles.

Response to Arguments

Applicant's arguments filed March 30, 2009 have been fully considered.

At the outset Applicant's amendment overcomes the previous 35 U.S.C. 103 rejections for claims 1, 15 and 24 and claims dependent thereon. The 35 U.S.C. 103 rejection for claims 42-46 has been maintained. Claim 39 has been rejected in a new 35 U.S.C. 103 rejection.

In response to the argument that Hong et al. does not teach "matching" the milling rates of the overcoat and the substrate as required by Applicant's claims, it is argued that the primary reference to Tao et al. teach depositing a first layer and a

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second layer where the etch rates of the layers "approximate" each other. The claims do not require "matching" but only "approximating". The layers are etched to produce a uniform planar face on a cross section of the layers. (See Tao discussed above; for uniform cross sectional face see Fig. 1c)

In response to the argument that Tao et al.'s teaching would not produce the desired topography of the cross-section face, it is argued that Applicant require producing a uniform cross sectional face topography and Tao et al. show in Fig. 1c production of a uniform cross section face topography. (See Tao et al. discussed above)

In response to the argument that Hong et al. does not teach utilizing a layer of carbon, it is argued that Hong et al. teach utilizing TiC or TaC as the cap layer 70 but other layers show as DLC (diamond like carbon) can be used as this layer. (See Hong et al. Column 5 lines 28-37)

In response to the argument that there is not motivation for combining Hong et al. with Tao et al., it is argued that the motivation for combining Hong et al. with Tao et al. is that it allows for controlling the etch rate of the various deposited layers. (See Hong et al. and Tao et al. discussed above)

This is action is made NON-Final based on the new rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-Th with every Friday off..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rodney G. McDonald/
Primary Examiner, Art Unit 1795

Rodney G. McDonald
Primary Examiner
Art Unit 1795

RM
April 8, 2009